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THE GREAT DISRUPTION: HUMAN NATURE AND THE RECONSTITUTION OF SOCIAL ORDER. By *Francis Fukuyama.* New York: The Free Press. 1999. Pp. xii, 354. $26

> The analysis of where norms come from is colored by the strong ideological preferences people have as to where they *ought* to come from. [p. 189]

For a long time — and through the now-quaint division of disciplines — morals and norms have been set apart from other behavior-biasing phenomena. They have also been set apart from each other. Morals are generally ceded in full to philosophers. Norms have been ceded to sociologists.

In retrospect, it is not clear why this should be so. Reality is notoriously impervious to taxonomy, and the axis supposedly distinguishing morals from other norms is, after all, arbitrary. Moreover, behavior-biasing phenomena interact in important ways, making the study of parts — without more — just the study of parts. But one thing is clear. To the extent that understanding morals and norms is important to law, studying the two apart from other behavior-biasing phenomena creates a problem.

This problem arises because of opportunity costs. Whenever a topic — such as morality — is both relevant to law and without a uniquely legal theoretical foundation, legal thinkers must rely (at least initially) on disciplines claiming expertise. But in a world in which the academy has divided reality into disciplinary slices — which, having once been sundered, are neither differently divisible nor easily recombined — there is an ever-present risk to law of disciplinary capture. As, for example, when legal thinkers may too hastily elevate the pro-

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nouncements of one discipline, perhaps the one most hypertrophied or shouting loudest, over another.

The costs of such disciplinary capture increase according to the value that foregone knowledge from another discipline would have offered. And in today's world, in which knowledge accumulates at an ever-quickening pace, these opportunity costs climb faster than ever before, making each choice about where to turn for insights on human behavior fraught with consequence. To disciplines like law, in particular, charged with practical matters of great human importance, the costs of foregoing useful knowledge can be affirmatively harmful, not just intellectually embarrassing.

As consumers and appliers of knowledge from other disciplines, legal thinkers should play — indeed should feel *obligated* to play — a far more active role in furthering interdisciplinary integration of subjects relevant to law. Of course, the inevitable limits on the accumulation of individual expertise make it endlessly tempting for even the most talented and committed interdisciplinary thinkers in the legal academy to mine a single disciplinary vein (economics or cognitive psychology, for example) to its maximum depths. There are economies of scale. And many great and useful insights can be and have been gained thereby. But the common isolation of our proliferated disciplinary mineshafts from even near neighbors often forecloses the important and available benefits that broad, cross-connective integration could provide. Put simply, scholars of various disciplines often work to solve the same problems, unaware that their efforts are closely paralleled by those with whom intellectual trade would yield mutual gains.

Such is the case with morals and norms. To the extent that legal thinkers have in fact recently begun to move beyond philosophy and sociology for more information, they have turned primarily to economics, psychology, and game theory. But even this happy development remains an incomplete achievement (reflecting, as it does, a latent tendency to elevate the social sciences over the life sciences, rather than partnering them). Behavioral biology has at least as much to offer to the study of morality and norms as these other disciplines, perhaps more. Many primatologists, behavioral ecologists, ethologists, neuroanatomists, and behavioral geneticists have long studied the origins of and patterns in, for example, human and nonhuman cooperation and altruism, reciprocity and hostility, division of labor, sharing of production, and identification and treatment of cheaters on social norms. Their work has sound theoretical foundations, and is empirically robust. Without the contributions of behavioral biologists to the study of morals and norms, legal thinkers risk errors that are harmful, not just intellectually embarrassing.

Why can we state this with confidence? Because: a) law is fundamentally about levering human behavior in directions it might not go

on its own; b) law's fulcrum in this effort is its model of where behavior comes from; and c) behavior is fundamentally a biological phenomenon. Consequently, *any* model of behavior inconsistent with the foundations of modern behavioral biology is inaccurate and obsolete. (Or else the unheralded ferment of a true intellectual and scientific revolution.) And thus legal approaches to understanding and influencing human behavior that are based on outdated behavioral models are simply less likely to effect socially and legally desirable outcomes than might be the case if the behavioral models were more conceptually robust.

This should hardly be surprising. The centrality of biology to understanding human behavior is not just a matter of academic accessorizing. Biology is not just another "and" at the "Law and ——" buffet, to be sampled at convenience, when tastes turn. Biology is truly foundational, having both broad and practical relevance at a completely different level of analysis than, say, economics or sociology. For just as theories of chemistry must be consistent, in the end, with theories of physics — and theories of biology must be consistent, in turn, with theories of chemistry and physics — theories of economics, sociology, psychology, philosophy, anthropology, and all the rest must be consistent, in the end, with the basic principles of biology.

The most basic principle of biology, in turn, is evolution — particularly evolution by natural selection. Natural selection occurs in any system in which there is differential reproductive success as a function of heritable variation. Put simply, any population of replicators, in which variations in heritable traits affect future replicative success, will tend, over generations, to accumulate an increasing proportion of traits that contribute to replicative success.[1]

The power of this deceptively simple insight — and its ultimate relevance to law — lies in its ability to explain not only species-typical patterns of form, but also species-typical patterns of *behavior*. (Or what some people term a species-typical *nature*.) More specifically, natural selection shapes the physical and chemical information-processing pathways of the brain in ways that have tended, over time, to contribute to the survival and reproductive success of organisms that bear them. These information-processing pathways yield behavioral predispositions. Of which, to circle back, morals and norms are a subset.

Francis Fukuyama understands all this.[2] He has written an exuberantly creative, thorough, and highly stimulating book on the relationship between political and economic order on one hand, and social

1. *See generally* sources cited *infra* note 27.

2. Francis Fukuyama is the Omer L. and Nancy Hirst Professor of Public Policy at George Mason University.

and moral order, on the other. Specifically, he argues that understanding the human future requires us to see underappreciated connections between politics, economics, law, social order, morals, norms, and biology. It is a big task. For Fukuyama undertakes nothing less, in *The Great Disruption: Human Nature and the Reconstitution of Social Order*, than to identify recent patterns in social order and disorder, to offer novel explanations for their origins, and to make predictions about what will happen next. But Fukuyama has never been one to shy away from big tasks. (His prior works include, for example, the ambitiously titled *The End of History and the Last Man*.[3]) And in *The Great Disruption*, true to his subtitle, Fukuyama ambitiously enlists the life sciences, integrating them with social sciences, in aid of a deeper understanding of human behavior and morality, and in furtherance of political science analysis.[4] His message is synthetic, explanatory, predictive, and in the end, consoling. His methods are, for legal thinkers and others, engaging, instructive, and sometimes cautioning.

I. CONTEXT

Fukuyama's major hurdle, in arguing for the relevance of life science perspectives on human morality, is context. His contextual problem extends past disciplinary divisions to the history of science itself. Beyond the endlessly important but by now cliché observation that bad things have been done in the name of good science, lies an even deeper resistance to his effort. For we can view the march of the science he invokes as, in many ways, leading a steady retreat from human uniqueness.

Time and again, through history, we have developed a perfectly plausible way of viewing our place on the planet. It comports with our preferences for the way the world ought sensibly to operate. It conforms to our convictions. It makes us feel special in the dark dangerous night. And then along comes some flag-waver like Fukuyama, preaching the scientific virtues of parsimony and falsification, who shoots our favored theories full of holes. Constructive or destructive? It depends on where you happen to be standing at the time. Progress is less preferable when progress threatens prominence.

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3. FRANCIS FUKUYAMA, THE END OF HISTORY AND THE LAST MAN (1992). Fukuyama's subsequent book, TRUST: THE SOCIAL VIRTUES AND THE CREATION OF PROSPERITY (1995), provides an equally ambitious argument that trust is the underappreciated linchpin of economic prosperity.

4. His efforts in this regard parallel that of legal thinkers, employing evolutionary analysis in law, who enlist life science perspectives in furtherance of existing legal goals. For information on the *Society for Evolutionary Analysis in Law* (SEAL), see <http://www.sealsite.org>. For sources exploring the utility to law of integrating biological perspectives, see *infra* note 27.

And science has, one must admit, served up steady threats to our prominence. When Copernican reasoning ultimately exposed as false our belief that Earth was the physical center of everything, we retreated to the less bold claim that at least, and after all, we among all life sprang full-blown from time, in full modern form, as the direct, special, and unchanged-from-the-beginning creation of a supernatural power. Theoretically possible — until Darwin shrank the probability toward zero.

Thereafter, we retreated into successively more humble claims to uniqueness.[5] First, we were the only tool users. But that didn't work.[6] Then we restaked the boundaries of uniqueness, imagining that we and we alone were capable of culture — the intergenerational and non-genetic transmission of novel information or forms of behavior. But that has proved to be equally incorrect.[7] Our latest, perhaps last, retreat therefore stakes the once imperialistic boundaries of human uniqueness ever closer to home — surgically dividing the moral from the amoral, with us in one camp, and all other life in another. If the physicists, chemists, biologists, anatomists, paleontologists, and astronomers can provide us few comforts in an expansive human uniqueness, then surely the philosophers can afford us safe and sole haven within moraled walls.

Francis Fukuyama apparently does not think so. For he grounds his argument, in *The Great Disruption*, on theory and evidence that modern human morality reflects the relentless influence of natural selection.[8] He is not the first to argue that morality cannot be fully un-

5. All species are unique, of course, by definition. But we have generally preferred to believe, *pace* Orwell, that some species are more unique than others, and that our own uniqueness is — well — unique.

6. Species as diverse as chimpanzees and crows have demonstrated the abilities not only to use tools, but to fashion them from raw materials. *See, e.g.*, Yukimaru Sugiyama, *Tool Use by Wild Chimpanzees*, 367 NATURE 327 (1994); Gavin R. Hunt, *Manufacture and Use of Hook-Tools by New Caledonian Crows*, 379 NATURE 249 (1996).

7. A recent study addressing all accumulated reports of chimpanzee cultural transmission made patent that we are not alone within the boundaries we have staked (at least so long as we avoid conveniently *ad hoc* definitions of culture that might require, for example, the painting of still lifes in acrylic). *See* Frans B. M. de Waal, *Cultural Primatology Comes of Age*, 399 NATURE 635 (1999); A. Whiten et al., *Cultures in Chimpanzees*, 399 NATURE 682 (1999).

8. To be sure, it is a grand mistake to think (as many apparently do) that the biology of behavior is about genes for this behavior or that, present in some portion of the population and absent elsewhere. As will be discussed further below, cutting edge behavioral biology incorporates far more important, far subtler, far more flexible, and far less reductionistic influences on behavior than that. Nonetheless, population-wide patterns in moral sentiments are predictably consistent with the knowable effects of evolutionary processes on the human mind. As Arnhart puts it, "Human beings have a natural moral sense that emerges as a joint product of moral emotions such as sympathy and anger and moral principles such as kinship and reciprocity," as a function of evolutionary history. LARRY ARNHART, DARWINIAN NATURAL RIGHT: THE BIOLOGICAL ETHICS OF HUMAN NATURE 7 (1998).

derstood without a biological foundation (as he would be the first to point out).[9] But where Fukuyama makes important original contributions is in his willingness to explore several possible *implications*, for tomorrow's questions about the human future, of evolution's effects on human morality. This Review will discuss the principal implications Fukuyama sees, and suggest several others in the legal arena.

What are morals, after all, but information-processing patterns that tend to bias behavior in this way rather than that way? If those information-processing patterns tend to bias behavior in similar ways, on average, across a species, in contexts likely to be long encountered throughout evolutionary history, they are likely to be the subject of selection pressures, which favor some outcomes more than others, and thus favor psychological mechanisms leading to adaptive responses more than others. To the extent these are even slightly heritable, the historically more adaptive psychological predispositions will tend to predominate over the less adaptive ones.

For a discussion of recent work attempting to locate moral information processing within particular portions of the human brain, see, for example, Steven W. Anderson et al., *Impairment of Social and Moral Behavior Related to Early Damage in Human Prefrontal Cortex*, 2 NATURE NEUROSCIENCE 1032 (1999); and Raymond J. Dolan, *On the Neurology of Morals*, 2 NATURE NEUROSCIENCE 927 (1999).

9. Fukuyama is preceded by many evolutionists. Among the sources that consider the relationship between biology and morality are RICHARD D. ALEXANDER, THE BIOLOGY OF MORAL SYSTEMS (1987); RICHARD D. ALEXANDER, DARWINISM AND HUMAN AFFAIRS (1979); ARNHART, *supra* note 8; BIOLOGY AND THE FOUNDATION OF ETHICS (Jane Maienschein & Michael Ruse eds., 1999); DONALD E. BROWN, HUMAN UNIVERSALS (1991); CHARLES DARWIN, THE DESCENT OF MAN (1871); DANIEL C. DENNETT, DARWIN'S DANGEROUS IDEA: EVOLUTION AND THE MEANINGS OF LIFE (1995); FRANS B. M. DE WAAL, GOOD NATURED: THE ORIGINS OF RIGHT AND WRONG IN HUMANS AND OTHER ANIMALS (1996); EVOLUTIONARY ETHICS (Matthew H. Nitecki & Doris V. Nitecki eds., 1993); INVESTIGATING THE BIOLOGICAL FOUNDATIONS OF HUMAN MORALITY (James P. Hurd ed., 1996); ROBERT J. MCSHEA, MORALITY AND HUMAN NATURE: A NEW ROUTE TO ETHICAL THEORY (1990); OSTRACISM: A SOCIAL AND BIOLOGICAL PHENOMENON (Margaret Gruter & Roger D. Masters eds., 1986); LEWIS PETRINOVICH, HUMAN EVOLUTION, REPRODUCTION, AND MORALITY 25 (1995); RICHARD POSNER, THE PROBLEMATICS OF MORAL AND LEGAL THEORY (1999); G.E. PUGH, THE BIOLOGICAL ORIGIN OF HUMAN VALUES (1977); R.J. RICHARDS, DARWIN AND THE EMERGENCE OF EVOLUTIONARY THEORIES OF MIND AND BEHAVIOR (1989); MATT RIDLEY, THE ORIGINS OF VIRTUE: HUMAN INSTINCTS AND THE EVOLUTION OF COOPERATION (1996); MICHAEL RUSE, TAKING DARWIN SERIOUSLY: A NATURALISTIC APPROACH TO PHILOSOPHY (1998); THE SENSE OF JUSTICE: BIOLOGICAL FOUNDATIONS OF LAW (Roger D. Masters & Margaret Gruter eds., 1992); JAMES Q. WILSON, THE MORAL SENSE (1993); ROBERT WRIGHT, THE MORAL ANIMAL: THE NEW SCIENCE OF EVOLUTIONARY PSYCHOLOGY (1994); C.J. Cela-Conde, *The Challenge of Evolutionary Ethics*, 1 BIOLOGY & PHIL. 293 (1986); Dennis L. Krebs, *The Evolution of Moral Behaviors*, *in* HANDBOOK OF EVOLUTIONARY PSYCHOLOGY: IDEAS, ISSUES, AND APPLICATIONS (Charles Crawford ed., 1998); Roger D. Masters, *Evolutionary Biology and Natural Right: Leo Strauss, Natural Science and Political Philosophy*, *in* THE CRISIS OF LIBERAL DEMOCRACY: A STRAUSSIAN PERSPECTIVE 49 (Kenneth Deutsch & Walter Soffer eds., 1987, corrected edition); R.J. Richards, *A Defense of Evolutionary Ethics*, 1 BIOLOGY & PHIL. 265 (1986); Michael Ruse & Edward O. Wilson, *Moral Philosophy as Applied Science*, 61 PHIL. 173 (1986); R. Trigg, *Evolutionary Ethics*, 1 BIOLOGY & PHIL. 325 (1986); Edward O. Wilson, *The Biological Basis of Morality*, ATLANTIC MONTHLY 53 (April 1998). For concise overviews of the resurgent interest in the influence of biology on human morality, see Jane Maienschein & Michael Ruse, *Introduction*, *in* BIOLOGY AND THE FOUNDATION OF ETHICS, *supra*, at 1, and Phillip R. Sloan, *From Natural Law to Evolutionary Ethics in Enlightenment French Natural History*, *in* BIOLOGY AND THE FOUNDATION OF ETHICS, *supra*, at 52; WRIGHT, *supra*, at 327-44.

II. THEMES OF *THE GREAT DISRUPTION*

In Fukuyama's view, maintaining social order in the face of technological and economic change is one of the greatest challenges facing information age democracies today (p. 10). Fukuyama's main concern, in helping us to face this challenge, is that we bridge disciplines and understand not only the sources of social disorder but also the processes by which social order is reconstituted. Those "renorming" processes include, he argues, not only the traditional and better-known forms of hierarchical, top-down norm creation, from governmental, religious, and community authorities, but also spontaneous, bottom-up renorming, which bubbles up independently of hierarchical impositions.

Developing this argument requires, and Fukuyama provides, an extended look at the relationship between hierarchical (formal) and spontaneous (informal) sources of order. It is here, in arguing for the probability, existence, and importance of spontaneous renorming, that Fukuyama draws not only on history and economics, but also on evolutionary biology, and biologically informed approaches to psychology and anthropology.

The book is significant for lawyers for three reasons. First, legal policymakers are, in part, in the business of combating social disorder; so a deeper understanding of both its multiple causes and the multiple ways in which order is reestablished may aid their efforts. Second, the work complements and extends recent legal scholarship that addresses the importance, origin, and development of norms (as the result of self-organization and sometimes surprising decisions of decentralized individuals[10]) and also addresses the centrality, to an understanding of

10. *See, e.g.*, Symposium, *Law, Economics, & Norms*, 144 U. PA. L. REV. 1643 (1996); Symposium, *Law and the Legal Process*, 50 STAN. L. REV. 607 (1998); Symposium, *The Legal Implications of Psychology: Human Behavior, Behavioral Economics, and the Law*, 51 VAND. L. REV. 1497 (1998); Symposium, *Social Norms, Social Meaning, and the Economic Analysis of Law*, 27 J. LEGAL STUD. (1998). A small sampling of the burgeoning literature includes Lisa Bernstein, SOCIAL NORMS AND DEFAULT RULES ANALYSIS, 3 S. CAL. INTERDISC. L.J. 59 (1993); Robert Cooter, *Law and Unified Social Theory: Thickening the "Self" in "Self-Interest" in* SOCIO-LEGAL STUDIES IN CONTEXT (D. J. Galilean ed., 1995); Kenneth G. Dau-Schmidt, *Legal Prohibitions as More than Prices: The Economic Analysis of Preference Shaping Policies in the Law, in* LAW AND ECONOMICS: NEW AND CRITICAL PERSPECTIVES 153 (Robin Paul Malloy & Christopher K. Braun eds., 1995); Robert C. Ellickson, *Law and Economics Discovers Social Norms*, 27 J. LEGAL STUD. 537 (1998); Peter H. Huang & Ho-Mou Wu, *More Order Without More Law: A Theory of Social Norms and Organizational Cultures*, 10 J.L. ECON. & ORG. 390 (1994); Christine Jolls, *Behavioral Economics Analysis of Redistributive Legal Rules*, 51 VAND. L. REV. 1653 (1998); Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471 (1998); Russell Korobkin, *Inertia And Preference in Contract Negotiation: The Psychological Power of Default Rules And Form Terms*, 51 VAND. L. REV. 1583 (1998); Bailey Kuklin, Evolution, Politics, and Law (March 2000) (unpublished manuscript on file with author); Donald C. Langevoort, *Behavioral Theories of Judgment and Decision Making in Legal Scholarship: A Literature Review*, 51 VAND. L. REV. 1499 (1998); Lawrence Lessig, *Social Meaning and Social Norms*, 144 U. PA. L. REV. 2181 (1996); Richard H. McAdams, *The Origin, Develop-*

norms, of game-theoretic analyses of how selfish interests can bring cooperative outcomes.[11] Third, the book usefully demonstrates, in a political science parallel to law, ways in which the tools of behavioral biology are both accessible to non-biologists, and useful in their academic enterprises. In that demonstration, there are a number of important lessons, taken up in Part IV below.

Fukuyama has three main points, reflected in the three main Parts of his book. In Part One, entitled "The Great Disruption," Fukuyama argues that the transition from the industrial age to the information age has been a mixed blessing. Specifically, when mental labor increasingly displaced physical labor, and services began to displace manufacturing as a source of wealth, this adversely affected our social relations and moral lives (pp. 3-4). For example, inexpensive information technology leads both to an increase in individualism and to the "miniaturization of community" (p. 91). It "erodes the boundaries of long-established cultural communities" with cheap but relentless television, radio, fax, and e-mail (p. 3), and it decreases meaningful, long-term, and truly engaged associations between people (pp. 5-6). As Fukuyama puts it, "The same innovation that increases productivity or launches a new industry undermines an existing community or makes an entire way of life obsolete" (p. 282).

This, in turn, increases social disorder. Or relatedly, as Fukuyama prefers to frame it, this causes a decline in *social capital*.[12] Social capital, the neglected cousin of physical capital (such as machines) and human capital (such as know-how), is the set of informal values or norms shared among members of a group that permit cooperation

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ment, and Regulation of Norms, 96 MICH. L. REV. 338 (1997); Eric A. Posner, *Law, Economics, and Inefficient Norms*, 144 U. PA. L. REV. 1697 (1996); Jeffrey J. Rachlinski & Forest Jourden, *Remedies and the Psychology of Ownership*, 51 VAND. L. REV. 1541 (1998); Robert K. Rasmussen, *Behavioral Economics, the Economic Analysis of Bankruptcy Law and the Pricing of Credit*, 51 VAND. L. REV. 1679 (1998); Jeffrey Evans Stake, *Loss Aversion and Involuntary Transfers of Title*, *in* LAW AND ECONOMICS: NEW AND CRITICAL PERSPECTIVES (Robin Paul Malloy & Christopher K. Braun eds., 1995); Cass R. Sunstein, *Social Norms and Social Roles*, 96 COLUM. L. REV. 903 (1996); Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175 (1997); Thomas S. Ulen, *The Growing Pains of Behavioral Law and Economics*, 51 VAND. L. REV. 1747 (1998). On the self-organization of complexity in law, see generally J. B. Ruhl, *Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: A Wake-Up Call for Legal Reductionism and the Modern Administrative State*, 45 DUKE L.J. 849 (1996); J. B. Ruhl, *The Fitness of Law: Using Complexity Theory to Describe the Evolution of Law and Society and Its Practical Meaning for Democracy*, 49 VAND. L. REV. 1407 (1996).

11. *See, e.g.*, Randal C. Picker, *Simple Games in a Complex World: A Generative Approach to the Adoption of Norms*, 64 U. CHI. L. REV. 1225 (1997); JACK HIRSHLEIFER, *Evolutionary Models in Economics and Law: Cooperation versus Conflict Strategies*, *in* ECONOMIC BEHAVIOUR IN ADVERSITY 211-73 (1987).

12. A brief history of the coinage and changing applications of the term appears on pp. 19-20.

among them.[13] Such norms include, for example, reliability, honesty, and reciprocity.[14] The "Great Disruption," of the book's title, is Fukuyama's term for the dramatic (and in his view largely negative) changes in social values, between roughly the mid 1960s and the early 1990s, that both reflected and contributed to a sharp, contemporaneous decline in social capital (p. 4).

Of course, empirically tracing fluctuations in social capital is no simple task. Fukuyama attempts to estimate changes in the supply of social capital, across several decades, by advancing a variety of positive and negative measures.[15] For the former, he uses data from surveys on the subjects of trust, values, and civil society, which correlate positively with the presence of social capital. For the latter, he principally employs data from national statistical agencies chronicling traditional indicators of social dysfunction. These track and evidence, he argues, the comparative absence of social capital. Such indicators include increased crime, decline of kinship as a source of social cohesion, decline in fertility, decline in the institution of marriage, increased illegitimacy, and the decline in trust — both privately (trust placed in individuals) and publicly (trust afforded institutions).[16] The data suggest that total social capital indeed declined between the 1960s and the 1990s, and that it did so more rapidly than it had during earlier periods of shifting norms.[17]

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13. P. 16. In other words, as Fukuyama explains, social capital can be variously understood to be: the subset of norms that constitutes society's stock of shared values, p. 14; a cooperative norm that has become embedded in the relationships among a group of people, pp. 27-28; and informal norms promoting cooperative behavior, p. 28. Thus, families, for example, are an important source of social capital. Pp. 16-17. James Coleman, the sociologist who is most responsible for bringing the term *social capital* into broader use, defined it as "the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive or social development of a child." P. 36 (citing JAMES S. COLEMAN, FOUNDATIONS OF SOCIAL THEORY 300 (1990)).

14. As Fukuyama illustrates:

> If members of the group come to expect that others will behave reliably and honestly, then they will come to *trust* one another. Trust is like a lubricant that makes the running of any group or organization more efficient. . . . Trust is a key by-product of the cooperative social norms that constitute social capital. If people can be counted on to keep commitments, honor norms of reciprocity, and avoid opportunistic behavior then groups will form more readily and those that do form will be able to achieve common purposes more efficiently.

Pp. 16, 49.

15. His analysis is anything but parochial. He examines data not only from the United States, but also from the United Kingdom, Sweden, and Japan, as well as Canada, Australia, New Zealand, France, Germany, The Netherlands, Italy, Spain, Norway, Finland, and Korea. *See, e.g.*, pp. 27-60.

16. Fukuyama reconciles the apparent overall decline in trust and community with data suggesting an overall *increase* in group membership by arguing that the "radius of trust" has shortened, and the number of people within one's community circle has lowered, yielding a net decline. P. 88.

17. A discussion of methods appears on pp. 20-24. Fukuyama finds that, starting in roughly 1965, virtually all developed countries experienced a simultaneous and rapid upswing in negative measures of social capital. P. 27. Crime rates in the United States, for ex-

Apparently, this matters. Declining social capital is bad, Fukuyama argues, not simply because cooperation is normatively nice, but because the kinds of cooperation social capital fosters are economically efficient. Specifically, social capital increases aggregate economic wealth by facilitating gains from trade, as individuals contract more with those parties with whom they share norms than they do with others.[18] Social capital is therefore critical to a successful economy. So critical is social capital, in fact, that Fukuyama describes it as a prerequisite not only for all forms of group endeavor in a modern society but for civil democratic society itself.[19]

In Part Two of the book, entitled "On the Genealogy of Morals," Fukuyama essentially addresses the question: If social capital is both crucial and declining, can it be reestablished and preserved, and if so, by what process? This inquiry requires him to explore, at some length, the sources of order in human society. A great many who have thought on the subject of this question apparently tend to believe that the reconstitution of social order is possible exclusively or primarily through hierarchical authoritarian interventions from political and religious spheres of influence (p. 6).

In contrast, Fukuyama argues that social order, once disrupted, tends to be reconstituted, even in the *absence* of hierarchically imposed interventions, such as laws, regulations, holy texts, or bureaucratic organization charts. Capitalist societies are not destined to become morally poorer as they become materially wealthier.[20] For social

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ample, declined slightly in the mid-1980s and then jumped up again in the late 1980s, peaking around 1991-92. P. 31. And this same pattern is evident in nearly all other non-Asian developed countries. P. 31. Because families are an important source of social capital, the dramatic shifts in social norms concerning reproduction and gender relations, specifically the pill-induced sexual revolution, the rise of feminism in the 1960s and the 1970s, falling marriage rates, and increasing divorce and illegitimacy rates "introduced massive changes not just in households but in offices, factories, neighborhoods, voluntary associations, education, even the military." P. 36; *see also* pp. 92-111.

18. As Fukuyama puts it:

> [S]ocial capital produces wealth and is therefore of economic value to a national economy.... [It enables individuals to] amplify their own power and abilities by following cooperative rules that constrain their freedom of choice, allow them to communicate with others, and coordinate their actions. Social virtues like honesty, reciprocity, and keeping commitments are not choice worthy just as ethical values; they also have a tangible dollar value and help the groups who practice them achieve shared ends.

P. 14.

19. Pp. 14, 20. Here Fukuyama follows the influential views of Putnam. *See* Robert D. Putnam, *Bowling Alone: America's Declining Social Capital*, 6 J. OF DEMOCRACY 65 (1995) (although the seeds of the idea are in de Tocqueville). Putnam has helped generate a large literature in both political and legal scholarship, in which questions of civil society, "civic republicanism," and communitarianism currently form a major theme. Almost none of this literature (apart from Fukuyama) pays attention to the evolved psychology of social relations, which any attempts to "reinvigorate" civic participation inevitably must engage and use.

20. For Fukuyama, it is technological change that disrupts social order, not capitalism itself. In his view, capitalism, while both a source of disorder and order, is probably a net

order can and will emerge spontaneously, even in the most technologically sophisticated parts of the global economy, as a bottom-up phenomenon — as a function of informal, unpublished, evolving norms in communities.

This obtains, Fukuyama argues, for two reasons, both revealed in the light of disciplinary integration. First, our species-typical human psychology is intrinsically predisposed, by biological heritage, to create moral rules and cooperative social order.[21] This follows from the predictable effects of evolutionary processes on inclinations that historically yielded individual advantage through the mutual gains social interaction can afford. The adaptive advantage these inclinations provided leave us psychologically uncomfortable when social order is disrupted.[22] There is therefore a dynamic interplay between the erosion of norms and the process of renorming, as reconstitution springs from our innate human nature to seek cooperation and moral rules that bind us together in ways often facilitating mutual gain. Second, we are also by nature rational, and rational calculation will make us realize the value of cooperation, prompting us to be, in fact, more cooperative. In three chapters at the heart of the book — Eight, Nine, and Ten — Fukuyama roots each of these two reasons (one less cognitive, the other more so) in modern evolutionary biology, having described the study of how order arises from self-organization as "one of the most interesting and important intellectual developments of our time" (p. 6).

To be sure, Fukuyama does not claim that spontaneous order can solve all collective action problems. And his discussions of the limits of spontaneous order, when hierarchical interventions are necessary to increase and maintain social capital, are among the most intellectually honest (if necessarily untidy) parts of the book (Chapter 13). But the fact that hierarchically imposed norms are often necessary does not undermine Fukuyama's principal point: spontaneous sources of norms are far more important to our understanding of human norms, and to the maintenance of a thriving economy, than previously accepted.[23]

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generator of norms. The very thing that makes capitalism thrive — self-interest — leads to cooperation. *See, e.g.*, pp. 253, 261-62.

21. "Human beings by nature are social creatures with certain built-in, natural capabilities for solving problems of social cooperation and inventing more rules to constrain individual choice." P. 231; *see also* p. 137.

22. This argument is summarized most succinctly on p. 6. *See also* p. 137 ("The situation of normlessness — what Durkheim labeled anomie — is intensely uncomfortable for us, and we will seek to create new rules to replace the ones that have been undercut. If technology makes certain old forms of community difficult to sustain, then we will seek out new ones, and we will use our reason to negotiate different arrangements that will suit our underlying interests, needs, and passions.").

23. For a discussion on how the presence of spontaneous renorming processes can provide an emotional basis for the development and maintenance of hierarchical institutions specialized in norm-making, see *infra* Section III.D.

These spontaneous sources of norms, Fukuyama claims, could *theoretically* help to counteract the Great Disruption of social norms (and thus social capital) occasioned by the transition from the industrial age to the information age.

In Part Three of the book, entitled "The Great Reconstruction," Fukuyama assesses the extent to which that theoretical possibility is probable. He argues that understanding how evolutionary processes have affected human behavior affords us some comfort in predicting that humankind will adapt to disruption with reconstitution, and that a healthy and stable social order will once again emerge.

Thus, the good news is that the social disruption is not here to stay, as the inevitable end of the Enlightenment, secular humanism, capitalism, and the like. Social and moral disorder is reversible through renorming processes. The bad news is that the reversal is not strictly inevitable (p. 282). For while "decentralized groups of people will tend to produce order if left to their own devices" (p. 253), this is a tendency, not an inevitability.

Fukuyama argues that successful and beneficial renorming processes involve not only the spontaneous renorming of a species predisposed to renorm, but also, ideally, two parallel effects. These include the effects of hierarchical impositions (such as state police powers and religious admonishments) as well as the efforts of rational individuals who, having recognized that their communal lives have deteriorated, "work actively to renorm their society through discussion, argument, cultural argument, and even culture wars" (p. 250). That is, at the same time that Fukuyama argues that spontaneous sources of order are probable, he also argues that we cannot passively rely on spontaneous renorming alone. There are still (many readers will be relieved to learn) important roles for careful public planning and hierarchical renorming. Specifically: "Rational hierarchical authority, in the form of government and formal law, will have to serve as supplements .... State authority in the form of formal law will always be a necessary complement and corrective ... to the extended order of human cooperation."[24]

Fortunately, argues Fukuyama, the early stages of reconstitution are already visible today. Fukuyama notes, for example, that rates of

24. P. 221. Discussing the probable persistence of hierarchical sources of order even in informal networks, Fukuyama states:

> We can argue that networks will become more important in the technological world of the future and yet concede that there are at least three reasons why hierarchy will remain a necessary part of organization for the foreseeable future. First, we cannot take the existence of networks and their underlying social capital for granted, and where they don't exist, hierarchy may be the only possible form of organization. Second, hierarchy is often functionally necessary for organizations to achieve their goals. And third, people by nature *like* to organize themselves hierarchically.

P. 222.

increase in crime, divorce, illegitimacy, and distrust have reversed or slowed substantially, particularly in the United States, but also in many of the other countries he identifies as having experienced sharp increases in social disorder in the 1960s (p. 271). He sees these data as evidence that "the Great Disruption has run its course and that the process of renorming has already begun" (p. 271). And, because internalized rules and norms of behavior are preconditions of successful reconstitution, Fukuyama predicts that "the world of the twenty-first century will depend heavily on such informal norms" (p. 7). We will see this in human organizations that show less reliance on formal hierarchies and more reliance on the shared values inherent in informal networks.

III. LESSONS AND CHALLENGES

The Great Disruption is forcefully written, original, and engaging. The tackled topic — predicting the social contours of the full information age society — is important. By raising and confronting the questions of how we can maintain and increase social capital in an increasingly fractured social world, Fukuyama identifies problems, the implications of which we may not have fully recognized, and tenders a framework for thinking about and confronting them. His book provides us not only with an interesting theory to explain recent disruptions in social order, but also with a better sense of the processes by which social capital — a key component of social order — is created and maintained.

One of the questions that I think the book does not squarely confront, however, concerns the issue of net effects. That is, we now know that technological change, for all the benefits it offers, can prompt declines in valuable social capital, thereby imposing costs. Fukuyama clearly considers these costs, were they to remain unremedied, unacceptable.[25] But remedies — replenishing social capital — also cost, presumably. Is there no point at which the magnitude of the gains from technology simply outweighs the costs, even if some quantum of lost social capital were never replenished?

While I am confident that Fukuyama has important things to say about this question, it still remains a question. But it is not the kind of question on which I wish to focus here. In my view, the real significance of the book is more in its method than its substance. Behavioral biology is the linchpin of Fukuyama's analysis, and of increasing importance in the legal arena, and it is therefore on Fukuyama's use of biology that I wish to concentrate.

25. After all, to label something a "Disruption" is, I think, to offer a value judgment rather than a mere description, identifying a normatively bad interference with what had previously been better.

Fukuyama has a clear vision of the importance of integrating life and social science perspectives into public policy analysis. But he does more, in this book, than simply turn to the evolutionary sciences (such as ethology, primatology, behavioral biology, evolutionary psychology, and evolutionary anthropology) for insights into human morality and future social ordering. He goes beyond integration and boldly attempts application, in the context of some very pressing issues. And this works better in some instances than in others.[26]

Fukuyama's invocations of biology reflect a current and sophisticated familiarity (to which the notes to Chapters 9 and 10, in particular, attest). He gives a broad and readable account of basic principles in modern evolutionary biology, drawing knowledgeably, for example, on the works of leading primatologists, such as Frans de Waal and Richard Wrangham. He neatly integrates accounts of the supplantation, by William Hamilton's and George Williams's theories, of earlier theories of group selection and the origins of altruistic behavior (p. 161). He provides explanations for the counterintuitive propositions that the self-serving orientation of genes will often lead to genuinely cooperative, sometimes even "altruistic," forms of behavior. And, to make the argument from biology comprehensible, he provides a competent and engaging survey of topics ranging from natural selection, sexual selection, and kin selection, on one hand, to cooperation and reciprocal altruism, on the other.

This is not easy to do, particularly in a comparatively short space, but Fukuyama does it rather well.[27] It is one of his great strengths that

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26. It bears emphasis that Fukuyama's approach is a sharp break from prevailing assumptions that philosophy and psychology can, either alone or in concert, provide adequate explanation for human morality and norms. It is also a sharp break from the recent trend to use game theoretic models of competing norms, analyzed solely at the cultural level of transmission, to explain dominant ones. It is an argument for both the utility and centrality of evolutionary theory in understanding complex human phenomena.

27. Pp. 154-86. For introductions to these subjects written explicitly for lawyers, see Timothy H. Goldsmith & Owen D. Jones, *Evolutionary Biology and Behavior: A Brief Overview and Some Important Concepts*, 39 JURIMETRICS J. 131 (1999) (addressing core principles of behavioral biology); Owen D. Jones, *Evolutionary Analysis in Law: An Introduction and Application to Child Abuse*, 75 N.C. L. REV. 1117, 1126-57 (1997) (Part I offers "A Primer in Law-Relevant Evolutionary Biology"); Owen D. Jones, *Law and Biology: Toward an Integrated Model of Human Behavior*, 8 J. CONTEMP. L. ISSUES 167 (1997) (discussing integration of life science and social science perspectives); Owen D. Jones, *Sex, Culture, and the Biology of Rape: Toward Explanation and Prevention*, 87 CAL. L. REV. 827, 841-53 (1999) (addressing core principles of behavioral biology).

Book-length popular accounts of behavioral biology include MATT RIDLEY, THE RED QUEEN: SEX AND THE EVOLUTION OF HUMAN NATURE (1994) and ROBERT WRIGHT, THE MORAL ANIMAL: EVOLUTIONARY PSYCHOLOGY AND EVERYDAY LIFE 55-107 (1994). Accessible textbooks include JOHN ALCOCK, ANIMAL BEHAVIOR: AN EVOLUTIONARY APPROACH (6th ed. 1998); DAVID BUSS, EVOLUTIONARY PSYCHOLOGY: THE NEW SCIENCE OF THE MIND (1999); TIMOTHY H. GOLDSMITH & WILLIAM F. ZIMMERMAN, BIOLOGY, EVOLUTION, AND HUMAN NATURE (forthcoming 2000); ROBERT TRIVERS, SOCIAL EVOLUTION (1985).

he sees the large-scale connectedness between historically separated aspects of the human condition. For example, he understands and manages to convey why there are biological bases to social emotions generally, and to moral sentiments and rule-following specifically.[28] Moreover, he weaves into his discussion information concerning the biological bases for status seeking, anger, guilt, pride, shame, jealousy, love of children, and the like.[29] He sees the deep commonalities between biological and economic reasoning, without naively supposing that these are without significant points of departure.[30] He sees the influence of biology on family relationships.[31] And, most significantly, he has a manifest awareness of the centrality of evolutionary theory in putting all of this in a coherent perspective.

There are a number of different lessons in this approach. The first lesson is that one cannot think accurately and comprehensively about important issues of human behavior without some sense of the historical, evolutionary contexts in which that behavior plays out. Period. To attempt otherwise is as silly as trying to explain modern geopolitical boundaries without any attention to history. The past shapes the present and constrains the future. To the extent that law is fundamentally about shifting human behavior in directions it might not otherwise go, the more historically accurate and contextualized framework that biology affords may help us to pursue our legal policies more efficiently.

Second, the general moral sentiments, including shame, guilt, sensitivity to injustice, a taste for reciprocity, and moralistic aggression, are rooted (like other emotions, such as sexual attraction and jealousy, love of offspring, distaste for incest and rape, and anger) in information-processing pathways that natural selection has influenced.[32] To the extent that morality and emotions are relevant to law,

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28. *See, e.g.*, pp. 149, 175-79, 184-85. For more on these topics, see Owen D. Jones, *Law, Emotions, and Behavioral Biology*, 39 JURIMETRICS J. 283 (1999).

29. *See, e.g.*, p. 184.

30. *See* pp. 161-62 (describing both "methodological borrowing" and differences between the fields). Richard Posner has explored a number of important connections between biological and economic reasoning. *See, e.g.*, RICHARD POSNER, SEX AND REASON (1992), where he observes that "there are illuminating analytical parallels between the biological and economic approaches . . . tne two approaches are mutually reinforcing and may in combination constitute a more powerful theory than either by itself." *Id.* at 88. The economist Jack Hirshleifer was among the first to observe the potential for integrating biological and economic insights. *See, e.g.*, Jack Hirshleifer, *Economics from a Biological Viewpoint*, 20 J.L. & ECON. 1 (1977). And Paul Rubin, among others, continues in this important tradition. *See, e.g.*, Paul Rubin, *The State of Nature and the Evolution of Political Preferences*, 3 AM. L. & ECON. REV. (forthcoming 2001).

31. *See, e.g.*, pp. 95-101 (describing biological underpinnings of family).

32. Darwin essentially argued this in *The Descent of Man*. *See* DARWIN, *supra* note 9, chs. 3, 5. It is interesting to note that John Rawls, in *Theory of Justice*, also speculated that there may be evolutionary origins to his basic claims about moral principles. JOHN RAWLS, THEORY OF JUSTICE 502-03 (1971).

the further study of biobehavioral influences on their pan-human, nonrandom patterns will provide a richer understanding of the reciprocal relationship between morality, culture, and law.

Third, integrating biology into discussions of politics, law, and other complex human behaviors is, while highly useful, at times extremely challenging. The following Sections describe four of these challenges.

A. *The Non-Normativeness of Norms*

One of the most challenging aspects of discussing the relevance of behavioral biology to human behavior, and particularly to morality and norms, is to leave norms out of it. By that, I mean that one must simultaneously acknowledge the evolutionary influences on the form and content of norms, and avoid concluding that the norms themselves are normatively good or bad, on the basis of biology alone.

Put another way: explanation is not justification, and description is not prescription. The realms of the descriptive "is" and the normative "ought" are logically separate. To combine them is to commit what is known as the Naturalistic Fallacy — arguing that what *is* is what *ought* to be.[33] (Committing this error gave Social Darwinists — forever — an aptly deserved bad name, as they misappropriated Darwinian ideas, and argued that the upper classes were upper by merit, and deserved to remain there, by biology.) The results of biological processes cannot be described as good or bad without identifying and injecting a value outside biology that makes us think them so. For example, we now have a great deal of information concerning biobehavioral influences on sexual aggression and on child abuse.[34] But that need never lead us to conclude that sexual aggression or child abuse are permissible.[35]

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33. The term was coined in G.E. MOORE, PRINCIPIA ETHICA 62, 89-110 (Thomas Baldwin ed., 2d ed. 1993), but the concept traces to the 1888 edition of DAVID HUME, A TREATISE OF HUMAN NATURE 469-70 (L.A. Selby-Bigge & P.H. Nidditch eds., 2d ed. 1978). The reciprocal and less recognized error is the one more commonly committed. One commits the Moralistic Fallacy whenever one attempts to reason (usually implicitly rather than explicitly): that the way something ought to be is the way that it is; that explanation follows inclination; and that facts follow preferences. For discussion of the Moralistic Fallacy, see Charles Crawford, *The Theory of Evolution in the Study of Human Behaviour: An Introduction and Overview*, *in* HANDBOOK OF EVOLUTIONARY PSYCHOLOGY: IDEAS, ISSUES AND APPLICATIONS 9 (Charles Crawford & Dennis L. Krebs eds., 1998); Jones, *Sex, Culture, and the Biology of Rape*, *supra* note 27, at 893-95; Charles Crawford, Book Review, 20 EVOLUTION & HUM. BEHAV. 137, 139 (1999) (reviewing *Uniting Psychology and Biology: Integrative Perspectives on Human Development*).

34. *See, e.g.*, Jones, *Evolutionary Analysis in Law*, *supra* note 27; Jones, *Sex, Culture, and the Biology of Rape*, *supra* note 27.

35. We could, therefore, maintain that the descriptive and normative realms are to be held *completely* separate. Of course, the matter is considerably more complicated than that. When we have a normative goal to change behavior, that goal is furthered by greater knowledge of the pathways by which the behavior arises. So much is clear. Less clear is the point,

Fukuyama meets this challenge of disentangling *is* from *ought* and demonstrates it is possible to invoke biology without claiming that what is biological is necessarily good. While he happens to believe that our evolved predispositions toward cooperation are good, it is because he values (not surprisingly) the effects of such cooperation on the economy and political order. Thus, it is because he values efficiency, increases in wealth, and political, civil, and democratic stability that he finds the particular biological predispositions to which he refers to be fortunate. This is not at all the same thing as claiming (as some critics incorrectly presume that those who invoke biology automatically claim) that all biological predispositions are fortunate, simply because they have evolved.

B. *Adapting to Adaptation*

A second challenge to future discussions of the biology of human psychological predispositions concerns the nature of adaptation. It turns out that it is not a simple matter to differentiate adaptations from by-products of adaptations.[36] This is hard enough when biologists examine anatomy, but it is particularly difficult when animal psychology is involved. Information-processing patterns are not easily observable, they interact with one another, and they often include, in any event, nested algorithms sensitive to variations in environmental stimuli. But it is even more difficult to predict how given human psychological adaptations will play out in the future.

Fukuyama predicts, for example, that humans will successfully renorm, in a way that preserves social capital, because evolutionary processes have rendered normlessness uncomfortable for us, and have left us psychologically predisposed to cooperate and solve collective action problems. While I share the author's hope for a successful and renormed human future, I am not yet persuaded that biology affords us quite the degree of confidence that Fukuyama thinks it does. For example, in Fukuyama's view:

> [K]nowing that there are important natural and spontaneous sources of social order is not a minor insight. It suggests that culture and moral values will continue to evolve in ways that will allow people to adapt to the

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which some have argued, that while the "is" does not strictly dictate the "ought," it may be inefficient and silly to generate an ought without *some* working knowledge of even potentially surmountable constraints on the "is." For example, Lewis Petrinovich argues that "The nature of what *is* should be understood as a factor to enable us to frame the *ought* in better terms." PETRINOVICH, *supra* note 9, at 25. This line of reasoning (how can you have anything but wildly irrational values if you are ignorant of facts) is also explored in DENNETT, *supra* note 9, at 467-68.

36. An adaptation is a heritable feature of an organism enabling it to survive, and to increase the copies of its genes that appear in the next generation, in its natural environment, better than if it lacked the feature.

> changing technological and economic conditions they face and that this spontaneous evolution will interact with hierarchical authority to produce an 'extended order of human cooperation'.... [W]e should presume that people will continue to use their innate capabilities and reason to evolve rules that serve their long-term interests and needs. [p. 244]

I am certain that Fukuyama is not arguing that reason alone, or evolved behavioral predispositions alone, are sufficient to guarantee or nearly guarantee a successful future. But I am equally certain that Fukuyama is arguing that our evolved behavioral predispositions very significantly increase the probability that such a future will obtain. I'm not sure this is right. I find it more difficult than Fukuyama does to conclude that knowledge of evolutionary processes affords us comfort in believing that humankind is very likely to meet the challenges of technological change.[37]

I have four reasons for reservation. First, 99.9% of all species that ever lived are extinct.[38] Presumably, many of them were well-adapted to their environments before some external change changed everything. The odds are against the long-term persistence of any species, let alone one as young and volatile as our own, encountering novel changes of our own creation, that we generate faster than generations.

Second, evolutionary processes adapt species to previously prevailing, not future, environments. True, we are a species for whom behavioral adaptability (or "plasticity") is itself an evolved adaptation. We are more adaptable than many other species, and our adaptability flows principally from the powerful cognitive capacities that enable us to crunch more data, in more sophisticated and nuanced fashion, than other creatures. So, to the extent that thinking hard about the present and future can help us turn the present into a viable future, our cognitive abilities may help us secure some endlessly renormed future. But this much we already knew. The optimism Fukuyama offers comes from the hope that our current brains are already up to future challenges, not from the confidence that natural selection will somehow shape our brains to successfully meet future challenges.

The distinction is important. We know that natural selection cannot design future-looking adaptations. The process is, after all, a mindless one — without foresight by definition. Natural selection appears never to have designed, nor do biologists expect it ever can design, an all-purpose adaptability mechanism designed to ensure adaptation to current or future social or technological change, when then-prevailing conditions differ from ancestral ones, in which current ad-

37. To be sure, Fukuyama is not naive enough to think that anything "*guarantees* that there will be upturns in the cycle [of social order]." P. 282 (emphasis added). A quite distinct optimism, however, just shy of confidence, pervades the book.

38. *See* DAVID RAUP, EXTINCTION: BAD GENES OR BAD LUCK? 3-4 (1991) (reporting the estimate).

aptations were designed. To the extent that features of our species or others function well in current environments, it is either because the environments have not changed materially from the environments in which those features evolved, or because those features, which were adaptive in ancestral environments for one reason, turn out also to be adaptive in a different, current environment for another.

Third, the animal kingdom provides daily examples of adaptations that run aground on environmental changes. Moths do circle lamplights, because the moon and stars used to provide reliable reference points for navigation. Squirrels vocally harass hunters, whose guns afford novel ways of killing them. People overconsume highly caloric foods, which contain energy concentrations never before encountered in nature. And humans continue to be sexually attracted to (and sexually jealous of) people they know are (and perhaps want to be) using contraception. An adaptation is only as good as the environment in which it continues to provide advantage — and historical adaptations can, during environmental shifts, prove downright deleterious.[39] Some of the evolved predispositions we manifest, therefore, such as aggressive responses to threats to status, may decrease the probability of a secure future precisely because they encounter novel technological features, from street-common handguns to intercontinental ballistic missiles.

Fourth, if our human psychology turns out not to be well-adapted to the technological environment we are creating for ourselves, we know that natural selection is unlikely to yield responsive adaptations anytime soon. Soon, by evolutionary standards, is measured in generations, which for humans are rather long, compared with the rapidity of technological changes. For the distribution within a population to manifest a "new" trait soon, a heritable trait must have arisen (through mutation or genetic recombination), and it must provide — in the then existing environment — a very pronounced reproductive advantage over alternative traits contemporaneously existing.[40] Such circumstances are generally rare, but even more so for a species like ours with small brood size.

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39. This can lead to something I refer to as "time shifted rationality" (to distinguish it from "bounded rationality") — the temporal mismatch of historically adaptive behavior and modern environments. *See* Owen D. Jones, Law, Behavioral Economics, and Evolution, Paper presented at The Olin Conference: Evolution and Legal Theory, Georgetown University Law Center (April 16, 1999), and the Annual Scholarship Conference of the Society for Evolutionary Analysis in Law (Sept. 24, 1999) (on file with author).

40. For an example of the strength of selection pressures necessary to cause speedy changes in morphology, see Jonathan B. Losos et al., *Contingency and Determinism in Replicated Adaptive Radiations of Island Lizards*, 279 SCIENCE 2115 (1998); Gretchen Vogel, *For Island Lizards, History Repeats Itself*, 279 SCIENCE 2043 (1998).

C. *Our Dispositions Toward Predispositions*

A third challenge concerns the subtle interactions of genes and environment. Fukuyama is far too sophisticated to put stock in the ridiculous notion that there can ever be a meaningful discussion of whether a given behavior is exclusively the province of nature or of nurture.[41] This is like debating whether the area of a rectangle is the product of its length or its width. All biological processes, including normal brain development, ultimately depend on rich environmental inputs. Similarly, all environmental influences can only be perceived, sorted, analyzed, and understood through biological, evolved processes.

At the same time, Fukuyama recognizes that the influence of bio-behavioral predispositions is more direct, and can be spoken of more meaningfully, in the contexts of some behaviors than others. (Compare extremes: sexual behavior, for example, on one hand, with filing an SEC disclosure statement, on the other.) This has led to a tendency, presumably in the interests of verbal economy, for Fukuyama to refer to some behaviors as being under "genetic rather than cultural control,"[42] or as being "determined not by culture but by biology."[43]

I think this tendency is, though understandable, unfortunate for two reasons. First, the use of the words "control" and "determined" — rather than variations of the word "influence," for example — may inadvertently reinforce the misperception that behavioral biology is about genetic determinism. A reader who has not attempted to keep pace with the explosion of modern biology literature, as Fukuyama has, might fairly recoil from the impression that some significant number of complex, non-reflex human behaviors are simply unavoidable. Second, by using language of mutual exclusivity (controlled by x *"rather than"* y; determined *"not by* [x] *but by* [y]") Fukuyama overdichotomizes in a way few biologists would sanction.[44] Again, this may confuse readers.

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41. *See, e.g.*, p. 158 (discussing the interplay of nature and nurture).

42. The author describes how a variety of mother-infant interactions "appear to be under genetic rather than cultural control." P. 96. *See also* pp. 158-59, 165.

43. P. 158 ("so too may human cultures reflect common social requirements determined not by culture but by biology").

44. For another example, see p. 187 ("[T]he particular norms and metanorms chosen by a given group of individuals are cultural choice, not a product of nature."). I think the distinction Fukuyama wants to draw here is not between culture and biology (or nature), but rather between cultural vectors of trait transmission and genetic vectors of trait transmission, both of which are biological. Culture is best considered as a fully integrated part of our biology — both in the sense that culture reflects natural selection's influence on the human brain, and also in the sense that cultural practices reciprocally affect human breeding patterns, and thus contribute to selection pressures that ultimately affect the spread of heritable human psychological predispositions.

Fukuyama somewhat underemphasizes, I believe, three things he knows, but that writers on human behavioral biology could probably and usefully make greater efforts to underscore. First, a predisposition is not a predetermination. One of the advantages of our large brain is that it can accommodate a very wide and highly nuanced range of inclinations — which by measures both large and tiny can increase or decrease the probabilities of various behaviors, in the face of various circumstances. Second, biobehavioral predispositions are generally condition-dependent (that is, context-specific), not automatic.[45] Third, and this point underscores the second, we are talking, in all of this, about the evolved psychology aspect of behavioral biology, not the behavioral genetics aspect.

The distinction is important, and rarely explicit. Behavioral genetics involves efforts to trace the different behaviors of different individuals to genetic differences among them. (This is what most people, incorrectly, think discussions of human behavioral biology are about.) In contrast, the complementary aspect of behavioral biology, concerning evolved or "species-typical" psychology, attempts to trace many of the different behaviors of different individuals not to different versions of genes, but rather to different environmental stimuli encountered by neurologically similar brains, sporting similar, evolved, and contingent decisional algorithms. That is, humans bear species-wide (in some cases sex-wide) physical, information-processing commonalities that have evolved to yield predispositions toward certain behaviors in the face of certain categories and confluences of stimuli, and predispositions toward other behaviors in other contexts.

D. *Reasons for Rationality*

A fourth challenge, and perhaps the one most crucial for the law at present, concerns the relationship between rationality, its supposed opposites, and biology. There are times, in *The Great Disruption*, when Fukuyama describes both sociality *and* rationality as products of human nature.[46] That is, he does acknowledge, in places, that ration-

45. This means that common psychological predispositions can sometimes underlie even cultural differences among groups, which may be the result of those predispositions processing materially different environmental circumstances. Contrast:

> One of the weaknesses of any attempt to use human nature to explain phenomena like trust and social capital is that it cannot give an account of the observable differences that exist between human groups. And so too here. The kinds of universal psychological characteristics described earlier as the basis for social capital are sufficient to explain why there should be social cooperation within relatively small groups, but they do not explain why different contemporary human societies have different radii of trust. These kinds of explanations must be entirely cultural in nature, and often need to refer back to a society's religious heritage.

P. 240.

46. For example:

ality is itself a function of our biology. He is not consistent in this, however. Fukuyama's approach generally demonstrates an apparent preference for sorting behaviors on a continuum bounded by the biologically influenced, at one end, and the rationally influenced, at the other.[47] In these contexts, the rational pathway to behavior is somehow distinct from the biological pathway to behavior. It is clear why Fukuyama wants to draw this distinction. He is attempting to construct a useful taxonomy that attends to differences in the *extent* to which given behaviors are rationally chosen. But I do think the distinction, as framed, is a bit misleading.

Of course, there are at least two different meanings to rational. One describes a process of cognitive decisionmaking. The other describes the substantive end product behavior, judged by a standard irrespective of the process by which that behavior was generated. (Much ink has been spilled by authors using mismatched meanings, such that rational processes can lead to irrational outcomes, and irrational processes can lead to rational outcomes.) But, whichever one of these two common meanings Fukuyama intends (I think it is the process-based former), it seems likely that Fukuyama over-separates the rational from the biological.

The biological/rational distinction only makes sense if the rational is not itself importantly biological. But of course it is. Rationality, as a process, is not just trivially biological, in the sense that thinking and decisionmaking happen to take place in living tissue with chemical needs and electrical outputs. Rationality is importantly biological in the sense that the structure of the brain is believed to contain features *evolved* to facilitate precisely the kind of multiple-variable, context-specific, calculus that increases the probability of the most adaptive

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[H]uman beings are *by nature* social creatures, whose most basic drives and instincts lead them to create moral rules that bind themselves together into communities. They are also by nature rational, and their rationality allows them to create ways of cooperating with one another spontaneously.

P. 6.

47. For example:

What we find is that order and social capital have two broad bases of support. The first is biological, and emerges from human nature itself. There have been important recent advances in the life sciences, which have the cumulative effect of reestablishing the classical view that human nature exists and that their nature makes humans social and political creatures with great capabilities for establishing social rules. While this research in a certain sense does not tell us anything that Aristotle didn't know, it allows us to be much more precise about the nature of human sociability and what is and is not rooted in the human genome. The second basis of support for social order is human reason, and reason's ability to spontaneously generate solutions to problems of social cooperation.

P. 138. *See also* pp. 152-53, figs. 8.3 & 8.4; p. 249 ("[H]uman beings will produce moral rules for themselves, partly because they are designed by nature to do so and partly as a result of their pursuit of self-interest."); p. 273 ("People are social animals by nature and, in addition, rational creators of cultural rules. Both nature and rationality ultimately support the development of the ordinary virtues like honesty, reliability, and reciprocity that constitute the basis for social capital.").

behavioral response.[48] The brain's ability and tendency to calculate is an evolved capability, in the same way that the breast's ability to yield milk after birth is an evolved capability. Neither is more "biological" than the other in this broad but basic sense. Both are species-typical aspects of ways in which genes pass themselves from one generation to the next.

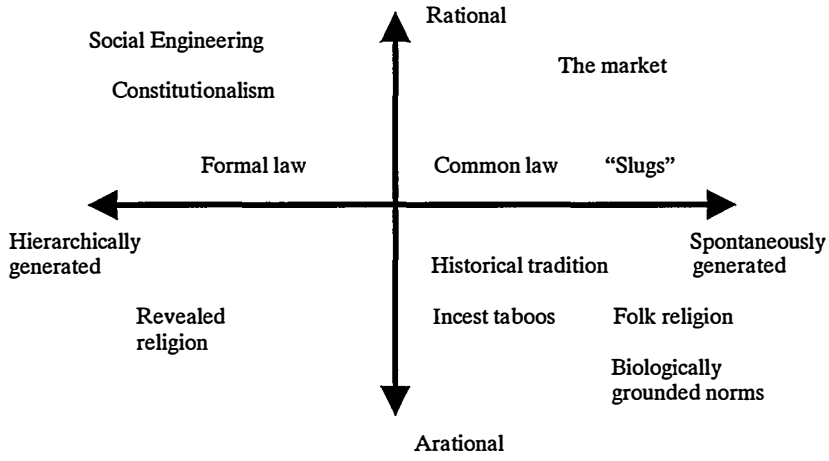
Similarly, for rationality as outcome, the brain of our species tends to yield rational conclusions (in many, but not all, circumstances) because ancestral individuals whose heritable brain design tended to yield irrational conclusions tended to behave in irrational ways. By definition, such behavior leads to individual disadvantage, and hence (typically) to reproductive disadvantage. That, over time, leads to proportionally fewer brains with a predisposition toward irrational preferences (which, we must remember, vastly outnumber rational preferences at every moment in time).

This leads me to conclude two things. First, that Fukuyama might have done better to label the antipode of rational causation emotional (rather than "biological") causation. Second, that Fukuyama might fruitfully have framed both the rational and the emotional within the biological. This second conclusion would afford biology a broader and more scientifically accurate role, and it would avoid over-cabining biological influences in the quadrant of Fukuyama's analysis in which only arational, spontaneous sources of order emerge. It would also highlight the deep connectedness between emotional and rational behavior, which in the end strengthens, in my view, many of Fukuyama's most interesting points.

In Chapter 8, Fukuyama offers an original, two-axis, four-quadrant framework for plotting sources of order (p. 152, fig. 8.3).

48. *See generally* THE ADAPTED MIND: EVOLUTIONARY PSYCHOLOGY AND THE GENERATION OF CULTURE (Barkow, Cosmides, & Tooby eds., 1992). The alternative includes context-insensitive decisional rules that are adaptive only on average. For example, a lemming swims across water. Most lemmings encountering water encounter streams, ponds, rivers, or lakes — which are swimmable and may afford new foraging opportunities on the other side. Sometimes the water is an ocean. But the behavioral predisposition is context-insensitive, leading to the unfortunate demise of many — but importantly not all — lemmings. For those who survive the statistically more frequent swims across shorter bodies of water, a swimming predisposition is still more adaptive, on average, than never swimming, and therefore such a species-typical predisposition can persist.

FIGURE 8.3: SOURCES OF ORDER



One axis spans from rational to arational sources of order. The bisecting axis spans from hierarchically generated sources of order to spontaneously generated sources of order. There are a variety of self-evident advantages to this framework. One of the disadvantages is that it sometimes obscures quite important relationships between different quadrants. For example, it can be interpreted to suggest that rational, hierarchically generated sources of order, including written constitutions, "formal law," and other consciously-constructed, top-down impositions of order are not significantly biologically influenced. Fukuyama locates incest taboos within the arational, spontaneously generated, "biologically grounded" norms. At the same time, it is clear that the opposite quadrant contains formal laws written to proscribe incest. Are these not also biologically influenced, as a function of the well-documented maladaptiveness of breeding between close relatives, and the adaptive moral repugnance that typically prevents it?[49] The content of a norm in the hierarchical rational quadrant can be strongly influenced by the content of a biobehavioral predisposition evolved as a function of natural selection.[50]

49. For discussion of the evolution of incest aversion, see ROBIN FOX, THE RED LAMP OF INCEST (rev. ed. 1983); Debra Lieberman & Donald Symons, *Sibling Incest Avoidance: From Westermarck to Wolf*, 73 Q. REV. OF BIO. 463 (1999).

50. The Uniform Commercial Code, which presumably occupies a position in the "hierarchical/rational" quadrant of Fukuyama's framework, states that "[e]very contract or duty within this Act imposes an obligation of good faith in its performance or enforcement." U.C.C. § 1-203 (1978). The force of the requirement is underscored by the fact that, in contrast to most other provisions of the Code, it cannot be waived by either party or otherwise contracted around. Although it requires some speculation, it seems probable that such a provision reflects one end result of natural selection's operation on predispositions con-

Fukuyama is clearly too sophisticated to believe that the quadrants are not intimately connected. Yet an emphasis on the inevitability of their interrelationship is neither highlighted nor explored. Fukuyama's structure causes readers to stop just short of making one of the most important points about formal law: many of its patterns reflect biologically influenced behavioral, moral, and emotional predispositions. Similarly, the two other quadrants of Fukuyama's framework, involving arational hierarchically generated sources of order, such as religions, and rational spontaneously generated sources of order, such as the common law, are imbued with biological influences on human morality and thus on behavioral predispositions. (Anyone who believes that religious proscriptions of sexual behavior or the common law's accommodation of crimes of passion do not reflect natural selection's operation on human emotions and tastes needs to think a bit longer.)

Framing rationality and emotionality as close cousins, as I suggested above, rather than as wholly different sources of behavior, requires taking two giant steps back. From this vantage, one can see the rational and emotional capabilities of the brain as merely varied manifestations of a single aspect of brain function. This aspect has evolved to solve one problem in a variety of different ways. The problem is: how to increase the proportion of copies of one's genes that appear in the next generation. That overarching problem is subdivisible, loosely, into a variety of different kinds of challenges. Some challenges require nutritional provisioning. Others require identifying and attracting a suitable sexual partner. Some require the ability to identify and avoid life-threatening injuries. Others require the sort of in-group maneuvering for advantage that we label political.

The remarkable thing about the human brain is that it has evolved to solve these different challenges by associating some kinds of environmental stimuli with some kinds of motivational mechanisms (e.g., the more visceral emotional pathways), and other kinds of stimuli with other kinds of motivational mechanisms (e.g., the more consciously analytical pathways). For example, there are some circumstances posing sufficiently grave threats, with historically effective options so limited, that conscious analysis can be dispensed with entirely. Under these circumstances, an appropriate physiological response can be directed, immediately following perception, by parts of the brain spe-

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cerning cooperative interactions, which operation tended to yield sharp moralistic reactions to "bad faith" (i.e., cheating) acts by defectors from cooperative undertakings. The evolved emotion toward cheaters likely led to a social norm, which led in turn to customary trade practices (*lex mercatoria*), some of which were imported to the common law, and later codified. Thus, the existence and content of the norm in the hierarchical/rational quadrant may derive from sources of social order in the spontaneous/arational quadrant, via the spontaneous/rational quadrant.

cializing in non-deliberative decisionmaking. That is, the behavior of the body is removed from rational control.

For instance, in moments of grave physical danger, the brain does not route the question of appropriate response to the rational calculator. Instead, it automatically increases heart rate and respiration. It ensures that adrenaline is secreted by adrenal glands, which natural selection has favored for performing precisely this function. And it temporarily redirects energy away from digestive, reproductive, and other postponable operations, making more energy available for physical maneuvering, such as flight. In addition, it yanks the conscious brain into directing its full and focused attention on a threat perceived elsewhere in the brain and not yet routed through the rational calculator. What we call fear is the aggregated physiological responses the brain directs as a result of evolutionary processes making this way of generating behavior more likely to result in adaptive response to environmental challenges than many other ways of generating behavior.

A more pointed (if somewhat graphic) example: men do *not* say

> Hmmm. I observe that my wife is having intercourse with another man. This is a breach of contract. It may yield an offspring, not mine, that by law I must care for and pay for as if it were. That is likely to be more costly, over time, than would be my effort to stop it. Hence, I should intervene. "Excuse me. . . ."

The raw absurdity of processing this sort of information through a rational calculator is not lost on natural selection, which routes the information in an entirely different way. That is, it is not purely because we have learned to be jealous that we are jealous. What we call jealousy is a state of the nervous system that we can identify only because it increases the probability of *behaviors* that we take to be consistent with sexual or emotional proprietariness.[51] The adaptive value of those behaviors, in ancestral environments, served to preserve the propensity to respond to infidelity with the information-processing predisposition that increases the probability of those behaviors.

The main point, though, is that emotional and rational approaches, as well as every combination of emotional and rational approaches in between, are all meaningfully biological. They reflect the effects of natural selection on the brain's ability to generate the appropriate behaviors for the appropriate circumstances.[52] Natural selection gives to the rational calculator what tends to belong there. That does not,

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51. On the evolution of jealousy, see DAVID M. BUSS, THE DANGEROUS PASSION: WHY JEALOUSY IS AS NECESSARY AS LOVE AND SEX (2000) and DAVID M. BUSS, THE EVOLUTION OF DESIRE: STRATEGIES OF HUMAN MATING (1994).

52. For an interesting discussion of how emotions also function, adaptively, as credible pre-commitment devices, see ROBERT FRANK, PASSIONS WITHIN REASON: THE STRATEGIC ROLE OF THE EMOTIONS (1988).

however, render the workings or product of the rational calculator any less meaningfully biological than emotions. And seeing the deep connectedness between the two may help us to avoid the same sort of over-division that our balkanized disciplines reflect.

IV. LEGAL IMPLICATIONS

What are the key legal implications of this line of reasoning? At the most general level, a biologically-informed approach to law — an evolutionary analysis in law — can help to refine behavioral models, generate new legal strategies, improve cost-benefit analyses, and point directions for future research.[53] In the specific contexts of morals and norms, there are several specific implications.

A principal utility of evolutionary analysis in law can be summed up in two words: universal acid.[54] Evolutionary analysis helps to dissolve intellectual untenability. No theory of mind, no theory of behavior, no theory of culture, and no theory of rational or irrational behavior can long stand if it is inconsistent with the way natural selection has shaped the information-processing, behavior-biasing patterns of brain function. It is certainly true, of course, that not everything in modern ethics can be properly thought to emerge inevitably from naturalistic sources. Nonetheless, evolutionary analysis prevents us from telling stories to ourselves about where morality comes from that are inconsistent with scientific knowledge about how the human brain came to be the way it is. Just as no theory of flight can be inconsistent, in the end, with the theory of gravity, no theory of human behavior, morality, or norms, no matter how seemingly transcendent, can be inconsistent with the process of evolution.[55]

With the underbrush of untenable theories thinned, evolutionary analysis next reveals under-recognized relationships between all the behavioral subjects of law's interest. It plays connect-the-dots with morals, norms, emotions, rationalities, irrationalities, tastes for risk, and the like, making a coherent picture from an otherwise insufficiently coherent assemblage of data points. Just as the relationship between the numbers 105, 30, and 2000 cannot be fully appreciated without reference to multiples of 5, the lowest common denominator, seemingly disparate human behaviors can be neither fully appreciated

53. *See* Jones, *Evolutionary Analysis in Law*, *supra* note 27, at 1226-41.

54. Dennett introduced the metaphor of evolutionary perspectives as universal acid in DENNETT, *supra* note 9, at 61-84.

55. This is not to say that evolutionary theory is categorically beyond scientific challenge. No scientific theory ever is. It is to say, however, that the evolutionary sciences are far more empirically and theoretically robust than current alternatives, and that any persuasive theory of norm formulation (for example) that is inconsistent with them bears the heavy burden of replacing them with a more accurate and systematically coherent theory.

nor reconciled without reference to psychological and generative commonalities most visible in the light of evolutionary analysis.

In short, evolutionary analysis provides a deeper, more accurate, more contextualized, and more nuanced framework for understanding the interplay between various psychological predispositions influencing behavior relevant to law. Its window on the mind opens a view on human behavior as the product of a brain that evolutionary processes have functionally specialized to perceive and process information in ways that tended to yield adaptive solutions to problems encountered in ancestral environments of evolutionary adaptation. This, in turn, yields at least three implications.

The first implication is that some norms of behavior relevant to law evolve not simply because they are more efficient than others, but because they are more appealing to the human brain than others — as a function of their effects in deep ancestral environments. Evolutionary analysis reveals the under-credited influence of visceral emotions with narrowly-tailored evolutionary significance on rational reflection and moral sentiments, from empathy to moralistic aggression.[56] Moralistic outrage at having been cheated by someone, for example, or at seeing someone else being cheated, can be seen to be no less a biological adaptation than our thumbs. The inquiry into what makes moral behavior feel good and immoral behavior feel bad (in broad brush) is analogous in important ways to investigating what makes sugar taste sweet and cardboard taste bad. (Answer: the former is an evolved, species-typical perception that biases eating behavior toward sources rich in energy usable by human physiology.) Once this is recognized, it is but a short step to resolving many otherwise seemingly puzzling preferences (for spiteful litigation, for example) or supposed irrationalities. These are sometimes, undoubtedly, the modern manifestations of historically adaptive psychological predispositions that are, in much-changed current environments, maladaptive. That they may lead us to seemingly irrational behavior in a novel environment does not make them inherently irrational or inexplicable.[57]

A second implication is that evolutionary analysis provides an entirely new tool of legal history. Because human brains, as a function of evolutionary processes, must inevitably share some historically adaptive information-processing pathways (emotions, moral fundaments, norms, and the like) that bias behavior, we would expect to see the imprints of these on human legal systems, cross-culturally. And, in

56. Richard Posner begins to explore the relevance of this in POSNER, *supra* note 9 (at 33-35. As an example, Amy Wax argues that an evolutionary perspective on reciprocity norms is useful in helping us understand public attitudes about welfare programs. *See* Amy Wax, *Rethinking Welfare Rights: Reciprocity Norms, Reactive Attitudes, and the Political Economy of Welfare Reform*, 63 LAW AND CONTEMP. PROBS. (forthcoming summer 2000).

57. *See* Jones, *supra* note 39.

fact, we do, although we rarely acknowledge the connection between evolutionary processes and legal artifacts. This is not to suggest, of course, that either the specific substance of law (say, the estate tax rate) or the specific procedure (of probating a will, for example) are directly traceable to psychological predispositions toward those precise legal requirements. It is to suggest that the general sentiments at the root of many human legal manifestations — and of our conceptions of law itself — are non-random.

It is not coin-flipping odds, for example, how the legal systems tend to provide that the property of an intestate decedent will flow (i.e., to relatives by marriage and blood, in priority according to degrees of consanguinity). Nor is the very notion of property coherent without reference to evolved psychological predispositions to acquire and use, or to share with some and exclude others. An evolutionary analysis — attending to ancestral effects of variations in normative reactions — helps explain why, for example, within all known human cultures, rape is proscribed to a degree disproportionate to other forms of physical harm that do not implicate reproductive capacities.[58] Just as history can provide important context for understanding geopolitical boundaries, and the future behavior of states, evolutionary analysis can provide important context for understanding the legal landscape, and the ways in which it may develop in the future. We will miss something important if we fail to see the connection between biologically influenced norms and the existence of, content of, and support for legal systems.

A third implication concerns efforts to predict variations in the effectiveness of different efforts to move human behavior with the tools of law. At the moment, we have neither a comprehensive nor a particularly accurate theory to explain why and predict when people will conform to certain legal prescriptions more than to others. Economics, certainly, helps us understand that, in many cases, people will behave as if they are cost-benefit maximizers of personal utility. But economics, alone, provides neither a basis for understanding why personal utility has the content it does (that is, it has no predictive theory of what people's tastes will be), nor a basis for predicting the strong emotional content to much human behavior relevant to law. Neither psychology nor sociology, unsupplemented by behavioral biology, can suffice to remedy this shortcoming. Evolutionary analysis can help.

For example, it seems to me that a principle derivable from biology, which might usefully be termed The Law of Law's Leverage, can provide tangible purchase for efforts to explain and predict those as-

58. *See* Jones, *Sex, Culture, and the Biology of Rape: Toward Explanation and Prevention*, *supra* note 27; Owen D. Jones, *Law, Biology, and Rape: Reflections on Transitions*, 11 HASTINGS WOMEN'S L.J. 151 (2000).

pects of human behavior that will be most sensitive and least sensitive to changes in legal rules. It consists of two symmetrical propositions.[59]

Proposition One: The cost of using law to reduce the incidence of any behavior will correlate positively with the extent to which that behavior was adaptive for its bearers, on average, in the relevant environment of evolutionary adaptation.

Proposition Two: The cost of using law to increase the incidence of any behavior will correlate negatively with the extent to which that behavior was adaptive for its bearers, on average, in the relevant environment of evolutionary adaptation.

This Law of Law's Leverage predicts, for example, that it will generally be less costly to shift a behavior in ways that tended to increase reproductive success in ancestral environments than it will be to shift behavior in ways that tended to decrease reproductive success in ancestral environments. The malleability of a behavior in reaction to changes in law — and therefore, to a great extent, the commensurate cost of trying to change the behavior — will tend to vary as a function of the extent to which the behavior was historically adaptive. Put another way, the slope of the demand curve for historically adaptive behavior that is now deemed to be socially (in some cases even individually) undesirable will be far steeper (reflecting less sensitivity to price) than the corresponding slope for behavior that was comparatively less adaptive in ancestral environments. Importantly, this rule will tend to hold, even when the costs that an individual actually and foreseeably incurs in behaving in a historically adaptive way exceed the presently foreseeable benefits of such behavior.[60]

CONCLUSION

Like the man who searches for lost keys only under the lamppost, because the light is better there, modern disciplines have tended to focus their efforts to understand human behavior on uniquely human cultural processes — because they are readily observable. Law has followed suit. But while the uniqueness of our species is obvious, it is neither physically nor behaviorally absolute. Relentlessly abrasive,

59. I suppose I could combine these into one rule. But clarity recommended bifurcation, at least for the time being.

60. This idea is explored at greater length in Jones, *Law, Behavioral Economics, and Evolution*, *supra* note 39. Legal contexts in which the Law of Law's Leverage will be particularly relevant will be those aspects of, for example, constitutional law, criminal law, family law, torts, property, and contracts that involve such things as: mating, fairness, homicide, child-rearing, status-seeking, property and territory, resource accumulation, sexuality (including infidelity and jealousy), speech, privacy, empathy, and crimes of passion.

systematic, and (emphatically) knowable evolutionary processes have wrought in us, as in all other animals, a behavioral repertoire of predispositions. That natural selection has afforded our brain unparalleled self-consciousness and rational ability should not obscure the unavoidable conclusion that our fundamental emotions, moralities, norms, and predilections — many of which underlie behavior of critical importance to law — often reflect adaptations to deep ancestral environments and conditions.

Against this background, *The Great Disruption* provides something far more significant than simply arguing for the importance of social capital to a thriving economy, and the importance of reconstituting social order as we move from an industrial to information age society. (Though those, themselves, are observations worth careful study.) By exploring how predispositions toward social order can evolve, *The Great Disruption* provides a valuable example of how integrating evolutionary perspectives on human brain and behavior can further the analysis of important social and political problems. Because so much of that integration focuses on the evolution of human moral sentiments, and because an understanding of morality is central to competent legal thinking, *The Great Disruption* therefore offers law some important insights.

For example, we should be asking not whether our moral sentiments could have been influenced by evolutionary history, but how it could be otherwise. Morality cannot simply be some arbitrary cultural artifact that happened to gain a foothold because some tabula-rasa human mind, in some socio-cultural milieu, invented it. Nor are our morals and norms the glorious and deduced end product of objectively indisputable ratiocinations. For whatever else they may be, morals and norms are fundamentally subsets of human behavioral predispositions, which are in turn a product of human information-processing patterns, which are in turn a function of human brain structure, which is in turn a product of evolutionary processes. This has a variety of implications for the way we think, not only about the relationship between law and morality, but also about the relationship between law and behavior.

Viewed in this light it is clear that morals and norms can remain divorced from biology through only the most artificial and disciplinarily jealous, xenophobic, and acontextual machinations. While it would be absurd to imagine that biology could alone provide a complete explanation for human moral behavior, it is no less equally absurd to imagine that moral behavior can be understood, in any deep way, without knowledge of the pathways and principles by which the information-processing, behavior-biasing patterns of the human brain came, through knowable evolutionary processes, to be as they are. An extreme view? Hardly. Science knows of no way by which it could be otherwise. Extremity is defined by the contrary assumption: that the

brain has somehow evolved beyond the reach of the evolutionary processes that built it. It is therefore mistaken and misleading, maybe more, to champion any theory of human norm or morality formation independent of the effects of evolution on the human brain.

Francis Fukuyama clearly sees all this. He raises some interesting questions about the implications, and offers some answers. And while I don't find all of them persuasive, I am persuaded that he is on the right track, and that legal thinkers should pay attention to the rich opportunities evolutionary analysis holds for their own discipline.